NOTES ON OTHER ACTUARIAL JOURNALS

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AMERICA

Transactions of the Society of Actuaries,
Vol. III, No. 5, March 1951

MYERS, R. J. *The* 1950 *Amendment to the Social Security Act,* pp. 1–30. A useful summary of the new legislation together with a discussion of its background and the estimated costs.

MILLER, M. D. *Group weekly indemnity continuation table study,* pp. 31–67. A comprehensive study of the rate of recovery from sickness based on a sample of 1949 claims under group weekly-indemnity policies issued by seven of the largest U.S. companies. Recovery is shown to be more rapid under plans providing benefits from the fourth day than under eighth day plans, to have a very different incidence as between males and females (non-maternity) and to decrease in rapidity with advancing age.

GERSHENSON, H. *Actuarial note: Reserves by different mortality tables,* pp. 68–73. If $q'_x = q_x + \theta_x/v\ddot{a}_{x+1}$, where θ_x is monotonic, $_tV'_x \gtreqless {}_tV_x$ according as θ_x is increasing, constant or decreasing. Vasmoen (*Skand. Aktuar.* 1935) has shown that the theorem can be extended to endowment assurances and that θ_x must lie between certain limits fixed in terms of functions based on the 'normal' table.

BAILLIE, D. C. *Actuarial note: The equation of equilibrium,* pp. 74–81. The verbal arguments of Lidstone's 1905 paper on changes in policy values are put into formal algebraic dress.

The number also contains digests of informal discussions on War Problems, Expense Rates and Office Methods, Group Insurance, Group Retirement Plans, General Questions and The Actuary's Responsibility.

Vol. III, No. 6, June 1951

ROSSER, H. *A present value approach to profit margins and dividends,* pp. 187–200. A 'demonstration by arithmetic' that the use of (i) asset shares, (ii) a contribution formula, or (iii) emerging surplus discounted at experience rates, all lead to the same results. The algebra is essentially contained in Appendix B of Lidstone's 1895 paper on surplus distribution.

SHUDDE, L. O. *Mortality experience under the old-age and survivors insurance system,* pp. 201–207. The experience is tabulated in quinary age-groups for each of the calendar years 1940–49. The exposed to risk were based on samples and widespread non-filing of death claims is indicated.

GROESCHELL, C. G. and SNELL, W. M. *Valuation of reversionary interests involving two or more lives for federal tax purposes,* pp. 208–220. Tables for application of Evans's method of calculating $\bar{A}^1_{xyz\ldots(m)}$ $(m = 2, 3, 4)$ according to Hunter's Makeham version of the Seventeen Offices table at 4%.

GUSTAFSON, D. R. *Terminal reserves from mean reserves and net premiums*, pp. 221–224. If $_tR_{\overline{xn}|} = \frac{1}{2}(_{t-1}V_{\overline{xn}|} + _tV_{\overline{xn}|} + P_{\overline{xn}|})$, it is shown that

$$_tV_{\overline{xn}|} \doteq \tfrac{1}{2}(_tR_{\overline{xn}|} + _{t+1}R_{\overline{xn}|} - P_{\overline{xn}|}),$$

and the remainder term is evaluated.

This number also contains digests of informal discussions on War Risk Underwriting, War Problems, Office Management and Expenses, Group Insurance, Actuaries' Clubs and the Society of Actuaries, and Miscellaneous Problems, together with a digest of a Smaller Company Forum.

AUSTRALASIA

Transactions of the Actuarial Society of Australasia,
Vol. VI, 1947–49

VAUGHAN, H. *Presidential Address* (1947), pp. 1–8.

POLLARD, A. H. *The principles and limitations of fertility indices*, pp. 9–23.

WHEATLEY, A. W. R. *Some remarks on office premiums*, pp. 25–39.

POLDEN, L. S. *The education and training of actuarial students*, pp. 41–59.

TRAVERSI, A. T. *Some remarks on the N.S.W. Legislative Members Pension Act*, 1946, pp. 61–68.

PARKER, A. M. *Financial problems*, pp. 69–88.

FLETCHER, J. B. *Presidential Address* (1948), pp. 89–98. Includes a comparison of office premiums for participating endowment assurances.

SUMNER, E. F. W. *The application of aptitude tests to the selection of actuarial students*, pp. 99–113.

WICKENS, P. C. *Children's interests in policies*, pp. 115–122.

RUTHERFORD, J. G. *The net premium valuation of children's deferred assurances*, pp. 123–134.

POLLARD, A. H. *Some remarks on voluntary group assurance*, pp. 135–146.

PALMER, G. B. *Industrial assurance—a comparison and a contrast*, pp. 147–169.

GASTINEAU-HILLS, M. H. *Marriage and mortality annuities*, pp. 189–191. Tables of D_x and A_x at 4 % according to status, based on the statistics published in *Transactions*, Vol. IV (see *J.I.A.* LXXIII, 144).

POLLARD, A. H. *A note concerning published annual vital statistics*, pp. 192–3.

DOWD, W. J. *Presidential Address* (1949), pp. 199–208. Includes a table of the distribution of Australian assets of life offices.

HANCOCK, J. H. E. *The actuarial aspects of recent amendments to public service superannuation schemes*, pp. 209–220.

MOONEY, D. J. *Electrocardiography*, pp. 221–232.

GRAY, J. C. *Some remarks on the valuation of reversions in Australia*, pp. 233–243.

TEMPLETON, E. H. *Salary scales in pension fund valuations*, pp. 245–259.

Note. Vol. V does not seem to have been received in this country but will be noticed in this article in a later number of the *Journal.*

BRAZIL

The Brazilian Institute of Actuaries was founded on 14 September 1944. A Bulletin and a Year Book have been issued each year since then. These are modelled on British and American, rather than on Continental, lines, the former containing reports of discussions of papers and the latter a reprint of examination questions. We wish the new Bulletin every success.

Boletim do Instituto Brasileiro de Atuária,
Vol. I, 1945

MADEIRA, J. L. *Bases técnicas do resseguro*, pp. 7–66. An interesting theoretical and practical study of 'excess loss' life reassurance. The data are based on 10–20 years' observations made by five Brazilian life offices and reported to the Brazilian Institute of Reinsurance.

MOURA, G. Q. P. DE. *Sôbre uma tábua de invalidez para ferroviários brasileiros*, pp. 67–87. A rather rough-and-ready calculation of disability rates based on the observation of ill-health retirements from thirteen railway funds in 1923–36. The rates amount to about ·3 % between ages 20 and 35, run up to 2 % by age 55, and attain 19 % by age 70; they are very unusual by European standards.

OLIFIERS, E. *Considerações sôbre a economia social e monetária da atualidade*, pp. 88–99. Blames monetary, rather than economic, causes for the high prices in Brazil in 1943.

SILVA, G. L. DA. *Quota da previdência*, pp. 100–103. Criticizes the methods adopted by the state for paying its social security contributions and pleads for new legislation.

GULTZGOFF, V. *Estudo sôbre a racionalização da tarifa de responsabilidade civil*, pp. 104–111. A contribution to the technique of premium calculation in accident insurance.

MÉDICIS, R. DA A. *Evolução do resseguro no Brasil*, pp. 112–136. A review of the history of reinsurance in Brazil and the nationalization of the industry in 1939. Life reassurance is on a risk premium basis applied to sums assured in excess of determined limits, but the Reinsurance Institute only retains a proportion of the sums thus reassured, spreading the remainder over all the six Brazilian life and all the non-life companies. In addition, an 'excess loss' system is in operation (see Madeira's paper above).

Vol. II, 1946

GREVILLE, T. N. E. *Subtabulação por mínimos quadrados de diferenças finitas*, pp. 7–37. Given the crude values of an observed function at intervals of five, viz. u_{5A}, u_{5A+5}, u_{5A+10}, ..., u_{5B}, the problem is to obtain the complete graduated series of values extending from u'_{5A} to u'_{5B} subject to the condition that $\sum_{x=5A}^{5B-z} (\Delta^z u_x)^2$ is a minimum (z fixed). Two alternative practical procedures are developed and a range of tables is supplied for $z = 2$, 3, 4 and 5.

MADEIRA, J. L. *Sôbre o cálculo da função gama*, pp. 38–55. Develops two formulae for $n!$ more accurate, but more complicated, than Stirling's.

MONTELLO, J. *Estudo sôbre os polinômios de Tschebycheff*, pp. 56–64. An expository account of Tchebycheff's orthogonal polynomials

Vol. III, 1947

MADEIRA, J. L. *A logística e o cálculo das suas constantes características*, pp. 7–87. A treatise on a generalized form of the logistic determined by the equation

$$\frac{1}{N_t}\frac{dN_t}{dt} = (\epsilon - \beta N_t)\left(\eta - \frac{\theta}{N_t}\right) = aN_t + b + \frac{c}{N_t}.$$

Applies the method of least squares directly to $\dfrac{1}{N_t}\dfrac{dN_t}{dt}$, where N_t is the population at time t, instead of to N_t.

NOGUEIRA, R. *Sôbre um sistema de equações algébricas e sua aplicação ao ajustamento das leis de sobrevivência*, pp. 88–147. A detailed theoretical investigation of the fitting of the generalized Makeham law $l_x = ks^x g_1^{c_1^x} g_2^{c_2^x} \ldots g_n^{c_n^x}$ by the King-Hardy method of summing log l_x in equal groups of ages, the number of groups required being $2n + 2$.

OLIFIERS, E. *Uma simbologia racional das fórmulas dos 'expostos ao risco'*, pp. 148–182. Emphasizes the importance of a systematic notation for functions appearing in exposed-to-risk formulae, especially for comparison of the census method with years-of-exposure methods. Claims that the consistent use of Whittall's (*J.I.A.* XXXI [1894]) symbols leads to the discovery of a common mistake in the treatment of 'existings'. See note on Wolfenden's paper, *T.A.S.A.* XLIII (*J.I.A.* LXXII, 253).

TRINDADE, M. *Aplicação do método dos cartões perfurados ao ajustamento das séries estatísticas por meio dos polinômios ortogonais*, pp. 183–205. An application of the punched-card multiplier to the fitting of orthogonal polynomials. The 11 pages of tables of polynomial values up to the fifth degree for series up to 30 terms in length are not so convenient nor extensive as those available in Fisher and Yates's *Statistical Tables*.

Vol. IV, 1948

MOURA, G. Q. P. DE. *Análise atuarial da Caixa de Pensões do Pessoal das Nações Unidas*, pp. 7–53. A pension fund for the 2000 personnel of the United Nations Organization was set up in January 1947 subject to 7% employee and 14% employer contributions. This article describes the check valuation made by the Brazilian member of the triumvirate of actuaries (American-Brazilian-Swiss) appointed for this purpose. Of interest are the high invalidity rates assumed and the appearance in the balance sheet of 30 'future generations'—with a contribution deficit of 1%.

JOURDAN, C. and NOGUEIRA, R. *Sôbre uma aplicação da teoria das equações de diferenças finitas ao problema da capitalização com sorteio de títulos*, pp. 54–69. Describes a 'lottery fund' in which, in return for a premium payable for m years, an 'insured' would be eligible to participate in an annual lottery in which the prize would be the nominal value of the policy *plus* 90% of the policy value at that date. If, at the end of n ($> m$) years, the policy has not previously been drawn in a lottery the nominal value is paid. Cantelli's theory of 'capitali accumulati' is directly applicable but the authors solve the problem independently.

MOURA, G. Q. P. DE. *Seguro doença e maternidade* (*Avaliação atuarial*), pp. 70–179. Detailed calculations of the cost of the sickness and hospital benefits granted under the Colombian social security law of 1946.

GULTZGOFF, V. *Mecanização do cálculo das reservas matemáticas da Cia. Seguradora Brasileira*, pp. 180–191. Gives details of the application of punched-card methods to a Karup valuation.

TRINIDADE, M. *O seguro privado no Brasil*, pp. 192–274. A review of the whole field of insurance in Brazil with particular reference to recent limitations on foreign companies.

Vol. v, 1949

FRIEDMANN, H. J. *Hereditariedade, mortalidade e seguro de vida*, pp. 5–22. Thinks that more attention should be paid to family history in assessing insurability and indicates a theoretical basis.

TRINIDADE, M. *Contrôle de responsabilidade em risco*, pp. 23–37. Describes the day-to-day operation of a centralized punched-card file providing information on all insurances in force in Brazil.

OLIFIERS, E. *Uma simbologia racional das fórmulas dos 'expostos ao risco'*, pp. 38–59. Applies the methods developed in Vol. III to multiple-decrement exposed to risk.

CZECHOSLOVAKIA

Aktuárské Vědy

This periodical commenced publication in 1929 (*J.I.A.* LXII, 165) and completed its eighth volume in 1950 (*J.I.A.* LXXVII, 126), all of them under the editorship of Prof. Emil Schoenbaum of Prague University. It is with regret that we learn that it has now ceased publication.

FRANCE

Bulletin Trimestriel de l'Institut des Actuaires Français, Nos. 194–195, March–June 1951

SAHUT D'IZARN, A. *Le taux réel de rendement des valeurs amortissables et la réserve de capitalisation*, pp. 35–217. Thesis submitted in 1943 for the title of *Membre Agrégé*. It discusses theoretically the values of bonds redeemable at a fixed date or by drawings with a number of tables and diagrams. The paper appears to have been written at the time when the author produced his *Tables financières* (Editions Lecerf, Rouen). The subject had become of importance in France because, by a decree of 30 December 1938, a *réserve de capitalisation* had been created for the purpose of covering depreciation in assets of insurance companies.

GERMANY

Blätter der Deutschen Gesellschaft für Versicherungsmathematik, Vol. I, Part 2, February 1951

JECKLIN, H. *Über gewisse Approximationen der Versicherungsmathematik*, pp. 3–16. Another paper on similar lines to those previously followed by the author (e.g. see *J.I.A.* LXXVI, 253).

WÜNSCHE, G. *Zur Rationalisierung der versicherungsmathematischen Rechentechnik*, pp. 17–29. In exemplification of his thesis that the future requires more economy of labour in actuarial practice, the author provides two nomograms, one for endowment assurance policy values and the other for office premiums. Refers to other work, e.g. Michel (*J.S.S.* VIII, 147) and the author (*J.S.S.* VIII, 216).

NEUHAUS, J. *Neuere versicherungsmathematische Ergebnisse und Probleme in U.S.A. und England*, pp. 31–42. Discusses papers published in the Centenary proceedings, the work by Jenkins and Lew, the American Commissioners 1941 Standard Ordinary Table etc., and refers also to disability.

LOREY, W. *Paul Riebesell* (9 June 1883–16 March 1950), pp. 43–50. An obituary of an actuary known in this country by his work and personally to several English actuaries.

FRIEDE, G. *Invariante Leistungssysteme*, pp. 51–67. Suppose that there are k decremental forces and that if the jth of them results in a claim in the tth year the benefit payable is R_{x+t}^{j}. Given the premium payable each year, the author seeks a series of 'sums assured', S_t, by which all k benefits payable in the tth year would be multiplied, this series being invariant when the given set of decremental rates is changed to another specified set. The solution is obtained and illustrated on a pension fund problem.

HEUBECK, G. *Rekonstruktion und Vorausberechnung beim kollektiven Bausparen*, pp. 69–74. A post-war building-society problem (see S. Vajda, *J.S.S.* VII, 29).

PÖTTKER, W. and ALBERS, G. *Ein Beitrag zu den Rechnungsgrundlagen der Krankheitskostenversicherung*, pp. 75–81. The official relative figures for medical costs at each attained age, published in connexion with the stabilization of the mark in the Western Zones, are combined with mortality, interest and lapse rates to give relative single premiums at each entry age. These are then graduated by a simple Fourier series with resulting simplification in the calculation of policy values.

BRAUER, E. *Neue Methoden in der Waisenrentenversicherung*, pp. 83–92. Criticism is levelled at the common practice of working with the mean number of children alive on the death of a member of a widows' and orphans' fund instead of with the mean orphans' annuity value. A method of passing from the former to the latter is devised.

PORTUGAL

Instituto dos Actuários Portugueses, Boletim
No. 4, December 1949

FERNANDES, L. DOS SANTOS. *Introdução na Demografia de alguns conceitos de Geometria das Massas*, pp. 7–13. The expectation of life and similar life contingency functions are interpreted in terms of concepts used in Statics.

ALEXANDRE, A. *Avaliação, para efeito do balanço técnico, do activo das instituições de previdência*, pp. 15–66. Advocates that the assets of a pension fund should be valued at the rate of interest used in the actuarial valuation of the liabilities. Illustrates its application to various types of assets including ordinary shares, real estate, etc.

No. 5, December 1950

CARAÇA, B. DE JESUS. *Sôbre a aplicação de um grupo de fórmulas do cálculo de probabilidades na teoria dos seguros de vida*, pp. 9–26. A posthumous reprint of a 1930 article on the survivorship of 'exactly *m*' and 'at least *m*' out of *n* lives.

CAMPEÃO, R. *Leis de probabilidade—Métodos gerais para a sua dedução*, pp. 27–81. An account of the basis of probability theory and the derivation of distribution functions.

NOVA, A. C. *Algumas considerações sôbre anuidades de invalidez*, pp. 83–96. Comparison of formulae for temporary and deferred disability annuities to active lives under the alternative assumptions that payments are in advance or in arrear, respectively.

JECKLIN, H. *Nouvelle méthode pour le calcul par groupes des réserves mathématiques en assurance-vie*, pp. 97–105. A summary of the author's new approximate valuation method introduced in the 1950 Swiss *Bulletin* (see *J.I.A.* LXXVII, 129).

LAH, I. *Eine Interpolationsformel des Zinsfussproblemes für steigende Renten*, pp. 107–117. A generalization to increasing annuities of the interpolation formula described in the 1951 Swiss *Bulletin* (see p. 139).

LEAO, A. *Regime financeiro do seguro social*, pp. 119–134. Steers a middle course between the advocates of accumulation and assessment methods of funding social security schemes.

SCANDINAVIA

Skandinavisk Aktuarietidskrift, 1951, Parts 1 and 2

BERGSTRÖM, H. *On asymptotic expansions of probability functions*, pp. 1–34. A general asymptotic expansion is derived for the probability function of the sum of *n* equally distributed random variables. The expansion is not necessarily in terms of the normal law and its derivatives nor does it contain moments, though such expansions may be obtained as a special case.

BARANKIN, E. W. *Concerning some inequalities in the theory of statistical estimation*, pp. 35–40. An alternative derivation of an inequality of Cramér in multivariate analysis.

SANDELIUS, M. *Truncated inverse binomial sampling*, pp. 41–44. If a binomial universe is sequentially sampled until a fixed number of 'successes' has been obtained, it is called 'inverse'. If, in addition, an upper bound is set on the sample size, the procedure is 'truncated'. An unbiased estimate of *p* and of its variance is provided under these conditions.

MEDIN, K. *A function for smoothing tables of the duration of sickness*, pp. 45–52. The force of termination of sickness after *t* years of sickness is represented by the five-parameter law $(\alpha + \beta x + \gamma x^2)(t + \delta x^2)^{-1-\epsilon x^2}$, *x* being the age at which sickness commenced, and an application is made to Swedish statistics (males) of the years 1936–37.

WEIBULL, M. *The regression problem involving non-random variates in the case of stratified samples from normal parent populations with varying regression coefficients*, pp. 53–71. An extension of this author's previous article (see *J.I.A.* LXXVII, 304) to the multinomial case mentioned.

HAGSTROEM, K.-G. *Pension schemes and life assurance in an economy with a fluctuating currency,* pp. 72–97. After showing that several methods of calculating cost-of-living indices lead to much the same results, the author illustrates two successful methods of pension fund financing in case of inflation.

Nordisk Försäkringstidskrift,
Vol. XXXI, Part 3, July 1951

SECHER, K. *On the prognosis of and the risk of infection with pulmonary tuberculosis,* pp. 209–224. The author is a doctor of medicine in Copenhagen. He finds that patients who might be considered healed after three years' observation have subsequently a mortality of $3\frac{1}{2}$ times the normal. 'Cured' cases must not be accepted for insurance at ordinary rates.

LINDWALL, L. *The so-called 'social deduction' for life assurance premiums in Sweden and inflation,* pp. 225–230. Compares saving by insurance, by banking and by investment in real estate, generally in favour of the first named.

QUALE, P. *Reinsurance problems especially in fire insurance,* pp. 231–251. It is interesting to follow the attempt to apply to fire insurance Lundberg's collective risk theory as developed by Cramér.

LUNDSKOG, S. *Private life and sickness insurance and social insurance in England,* pp. 252–258.

Vol. XXXI, Part 4, October 1951

LOKEN, J. *Insurance, war and nuclear fission,* pp. 289–300. Discusses various risks and concludes that while the catastrophe risks in wartime or from explosions in peacetime are uninsurable there will be sufficient precautions taken against radiation risks to render them insurable.

STERNBERG, I. *Number and size of fires in relation to hours and seasons,* pp. 314–326. Statistics based on Swedish experience. The majority of fires start during working hours but the smaller number during the night are more expensive. The worst day of the week for fires is Friday and the best Sunday.

SWITZERLAND

Mitteilungen der Vereinigung schweizerischer Versicherungsmathematiker
Vol. LI, Part 1, 1951

AMMETER, H. *Ein neues Testverfahren für geordnete Beobachtungsreihen und seine mathematischen Grundlagen,* pp. 21–36. An interesting suggestion to combine mortality table graduation tests of smoothness and fit by using as criterion the second (instead of the first) sum of squares of standardized deviations. Reference is made to *Biometrika* for the detailed mathematics.

JECKLIN, H. and ZIMMERMANN, H. *Ergänzende Bemerkungen zur Reserveberechnung auf Basis hyperbolischer Interpolation (F-Methode),* pp. 37–52. Further notes on the practical application of Jecklin's F-method of approximate valuation (see *J.I.A.* LXXV, 114; LXXVII, 129; and *J.S.S.* X, 119). The subjects covered are: calculation of valuation constants, splitting of the term into two or more parts, application to paid-up policies and to limited premium assurances, and the range of applicability. Further study is being made of the last problem.

NOLFI, P. *Betrachtungen über konsekutive Verteilungen*, pp. 53–62. Proves that with a closed community subject to a single decrement, the binomial distribution law of decrements is valid even though the instantaneous probability of individual decrement is changing with time. The method of proof used is identical with that communicated by G. J. Lidstone to one of the authors of these notes in 1943.

HAGSTROEM, K.-G. *Etude statistique du risque mathématique dans l'assurance collective sur la vie*, pp. 63–89. A discursive treatment of the risk problem similar to that noticed in *J.I.A.* LXXVII, 128. The data used for illustration, derived from the Baloise life insurance company, are more detailed than those of the U.S. group of companies.

LAH, I. *Eine praktische Interpolationsformel des Zinsfussproblems von hoher Präzision*, pp. 91–100. Linear interpolation between annuity values at two different interest rates leads to over-large intermediate values; linear interpolation between the reciprocals produces too small annuity values at intermediate rates of interest. A linear compound of these two approximations is constructed which is very close to the truth at the middle of the interval and a good approximation throughout. No numerical examples. (This paper reappears in summary form among the *Proceedings* of the XIIIth International Congress.)

E. MARCHAND, in his presidential address of October 1950, states that the three most pressing problems for Swiss actuaries are the discovery of means
(1) to combat diminishing yields,
(2) to expand investment outlets,
(3) to effect rationalization of office routine in order to reduce expenses.

Vol. LI, Part 2, 1951

MARCHAND, E. *Le cinquantenaire de l'Union des Actuaires danois*, pp. 101–103.

JECKLIN, H. *Der XIII. internationale Kongress der Versicherungsmathematiker*, pp. 105–136.

JECKLIN, H. and ZIMMERMANN, H. *Weitere Ergänzungen zur F-Methode der Reserveberechnung*, pp. 137–163. These further remarks on the practical application of the F-method (see p. 138) relate to (i) the splitting of the term into two or more periods, (ii) pre- and post-dating, (iii) treatment of assurance types the reserves of which do not increase steadily from 0 to 1, and (iv) the accuracy of one of the algebraic approximations involved.

ZIMMERMANN, H. *Nomogramme zur 'F-Methode'*, pp. 164–170. Nomograms of the 'straight-edge' type are discussed.

ZWINGGI, E. *Ein weiteres Verfahren zur näherungsweisen Prämienbestimmung in der Invalidenversicherung bei Variation der Rechnungsgrundlagen*, pp. 171–177. The author returns to the problem of assessing the effect on the annual premium for a disability income of a change in the Makeham constants of the disability rates (see *J.I.A.* LXXV, 251). The new method appears to be very accurate.

ZWINGGI, E. *Notiz zur Berechnung der Vermehrungsrate der stabilen Bevölkerung*, pp. 178–180. An alternative solution is offered for r in the 'characteristic equation' of population mathematics, viz.

$$\int_{y_1}^{y_2} e^{-ry} p(y) f(y) \, dy = 1.$$

NOLFI, P. *Betrachtungen zum Beharrungszustand einer Pensionskasse*, pp. 181–190. The author measures the influence of interest on a particular pension benefit by $\sigma(i) = 1 - P(i)/P(o)$, where $P(i)$ is the annual contribution rate for that benefit based on interest i. He applies this concept to a stationary fund of active members, old-age and ill-health pensioners, widows and orphans.

LAH, I. *Eine neue Funktion der Versicherungsmathematik und ihre Anwendung*, pp. 191–210. The 'new function' is $(-1)^n n! v^n D_x^{-1} \sum_{t=0}^{\omega-x-1} \binom{n+t}{n} D_{x+1+t}$ and particular attention is paid to derivatives with respect to i. An earlier paper is referred to (see *J.I.A.* LXXIII, 444).

RUFENER, E. *Eine Bemerkung zum Zinsfussproblem*, pp. 211–215. Proves that there is precisely one rate of interest, independent of the 'life table' $\Phi(x)$, which satisfies the generalized annuity relation

$$a(x, v) = \sum_{t=0}^{\infty} R(x+t) \frac{\Phi(x+t)}{\Phi(x)} v_t, \quad \Phi(x) \geqslant o.$$